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THE REPTILES OF BARROW ISLAND

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SUMMARY

The 38 terrestrial and 6 marine species of reptiles from Barrow Island are listed, including the first specimen of the sea snake *Emydocephalus annulatus* from Western Australia. The biology of the terrestrial species is discussed with respect to their distribution on the island, breeding condition, diet, body size and time of activity. The relationships of the Barrow Island fauna to the mainland fauna are discussed.

INTRODUCTION

Barrow Island is an A class reserve situated 85.5 km north of Onslow, Western Australia. It is 29 km long and 8-13 km wide and rises to an altitude of 65 m.

The first collections were made in 1840 by J. Lort Stokes in HMS *Beagle*. Since then the island has been visited by many naturalists: J. T. Tunney (1900), F. Lawson Whitlock (1917-18), F. Hill (1955), a joint Western Australian Museum-CSIRO expedition (1958), W. H. Butler (1964 and 1965), A. A. Burbidge and A. R. Main (1969). All these workers were primarily interested in birds or mammals. W. H. Butler made the first extensive collection of reptiles in 1964 when he collected 28 species (*Western Australian Naturalist*, 11: 156-158), but even then reptile collecting was secondary to mammal collecting.

I was on Barrow Island from 17 August-13 September 1973 when I collected a sample of as many species of reptiles as possible.

For localities in the text, readers are referred to the map of Barrow Island in the *Western Australian Naturalist*, 11: 150.

METHODS

Where possible the following data were recorded for each specimen: date and time of capture, details of habitat and behaviour (its activity when first sighted and its reactions when flushed). Each specimen was given a field number.

Because of the cool conditions during my stay (mean daily maximum, 25.3°C) most of the 38 species were inactive. However, a combination of judicious burning of *Triodia* and *Spinifex* clumps, examination of rubbish sites and "stalking" in a fixed area over a period of time produced a reasonable sample of most species.

In addition pit traps were dug: a line of 6 just north of Town Point and a line of 12 at Flacourt Bay. Both lines ran from siliceous fore-dunes and traversed dunes, where possible alternating dune crest with interdune.

Each specimen was identified, measured in millimetres (snout vent length) and weighed (weight of preserved specimen) and had the stomach removed and the contents, where possible identified. Testes were measured and ovaries were examined for indications of breeding.

I have augmented my collection with specimens previously collected on the island.

LIST OF SPECIES

Where possible the following is recorded for each species: number of specimens examined (in brackets after the species names), snout vent length (mean in brackets after the range) and breeding data. Temperatures at which some species were active and some details of habitat are also given (see under discussion for more details of habitat preferences). The numbers preceding species names refer to the numbers in Table 3.

TURTLES

Family CHELONIIDAE

Chelonia depressa Garman. Flatback Turtle (1).

The remains of one turtle were found at Dove Point.

Chelonia mydas (Linn.). Green Turtle

A survey of the island's coastline on 31 August and 1 September showed that there were approximately 350 Green Turtles, either on the beaches or wallowing in the shallows within sight of the beach. All but about 50, which were in Bandicoot Bay, were along the west coast.

Eretmochelys imbricata (Linn.). Hawksbill Turtle.

Not seen by me. Commonly seen in shallow pools at low tide or swimming in the shallows (Butler, 1970).

LIZARDS

Family GEKKONIDAE

1 *Diplodactylus stenodactylus* Boulenger.

Crowned Gecko (2).

SVL 33 and 40. Both under debris.

2 *Diplodactylus taeniatus* (Lonnberg & Andersson) (9).

SVL 32-40 (37). Breeding: 2 eggs. All specimens out of *Triodia angusta* on siliceous sands and loams.

3 *Gehyra punctata* (Fry). Spotted Dtella (6).

SVL 31-40 (35). Breeding: 1 egg. Previous collectors found this species in termite mounds. Those I collected came from conglomerations of man-made rubble such as cement.

4 *Gehyra variegata* (Dumeril & Bibron). Tree Dtella (10).

SVL 37-43 (37.8). Breeding: 1 egg. Under debris such as timber, iron and old tyres.

5 *Heteronotia binoei* (Gray). Bynoe's Gecko (27).

SVL 28-47 (37.7). Breeding: 2 eggs. In *T. angusta*. Particularly common under man-made debris.

Family PYGOPODIDAE

Kluge (1974) has shown that Butler's series of *Delma fraseri* (Butler, 1970) comprised three species.

6 *Delma borea* Kluge (1).

SVL 71. Out of *Triodia* just inland from Shark Point.

7 *Delma nasuta* Kluge (53).

SVL 53-100 (81.7). Females larger than males (mean 90.9 vs 79.5). Breeding: females 85-100 (2 eggs), non breeding females 73-86. In *T. angusta* on red sands and loams.

8 *Delma tinctoria* De Vis (3).

SVL 64-73 (67). Breeding: 1 egg. All three specimens came from rocky areas with sparse topsoil and *Triodia wiseana*.

Lialis burtonis Gray. Burton's Snake-lizard (17).

SVL 96-280 (186.6). In *T. angusta*.

Pygopus nigriceps (Fischer) (1).

The posterior half of one specimen was collected. It had 13 preanal pores.

Family AGAMIDAE

Amphibolurus caudicinctus caudicinctus (Gunther).

Ring-tailed Dragon (26).

SVL 29-60 (45), all subadult. Seen all over island but most commonly in rocky areas. I watched a Nankeen Kestrel (*Falco cenchroides*) preying on them.

9 *Amphibolurus minor* Sternfeld. Western Jew Lizard (1).
SVL 100. Breeding: 6 eggs; collected 4 September; five others seen over the next three days. Mean maximum temperature for 22 days up to 4 September was 24.7°C mean maximum for three days after 4 September was 29°C. All but one, which was running, were perched 2-3 m up in dead *Haakea lorea*, or *Acacia* shrubs.

10 *Physignathus gilberti gilberti* Gray.

Gilbert's Water Dragon (6).

SVL 50-102 (87.8). Breeding (one female with three follicles enlarged in one ovary, two in the other). Restricted to the few straggling mangroves of the east coast.

Family SCINCIDAE

11 *Carlia triacantha* (Mitchell) (1).

SVL 31. From a well vegetated interdune near Town Point.

12 *Cryptoblepharus carnabyi* Storr (4).

SVL 32-35 (33.7). Breeding: 2 eggs. Seems to prefer places where there are vertical faces to climb. Specimens came from mangroves, a eucalypt trunk, the wall of a building and the face of a sink hole.

13 *Ctenotus fallens* Storr (61).

SVL 26-97 (72.2). Males average 70, females 74. Breeding. This, the dominant skink on the island is found in all habitats. It is numerous on coastal dunes; in *Spinifex longifolius* on siliceous foredunes and on consolidated dunes where the vegetation tends to clump in thickets of *T. angusta*, acacias and small shrubs. Similar thickets are formed in gullies in the interior of the island. These thickets are similar to the clumps of *S. longifolius* in that they create a loose-knit lattice of vegetation. This situation suits *C. fallens* in its feeding. It is a forager, dividing its time between stalking in partly open (shaded) areas on the ground and climbing around in vegetation (up to 0.5 m above ground). Rarely seen feeding in open, unshaded areas.

14 *Ctenotus grandis* Storr (4).

SVL 34-112 (78.3). The one specimen I collected came from an area with light sand.

15 *Ctenotus pantherinus acripes* Storr (26).

Sample falls into two size groups viz. SVL 42-62 (52.2) and 72-94 (84.7) overall mean 66. Breeding: one female with 6 eggs, 7 mm in diameter. Rocky areas with *T. wiseana*.

16 *Ctenotus piankai duricola* Storr (2).

SVL 52 and 53. Both specimens from a rocky area near Shark Point.

17 *Ctenotus serventyi* Storr (1).

SVL 43. The single specimen was collected on siliceous sand at Surf Point.

18 *Lerista bipes* (Fischer) (15).

SVL 52-53 (49.2). This fossorial species was found in consolidated dunes and loamy flats.

19 *Lerista elegans* (Gray) (2).

SVL 28 and 30. These specimens, collected by Butler, came from "Triodia on sand".

20 *Lerista muelleri* (Fischer) (6).

SVL 25-37 (30.1). One female with one follicle enlarged. Found among consolidated dunes.

21 *Morethia lineocellata* (Dumeril & Bibron) (1).

SVL 21. Still only known on the island from the original specimen collected by Butler.

22 *Morethia taeniopleura exquisita* Storr (9).

SVL 29-35 (32.4). In all habitats but mostly siliceous foredunes and consolidated dunes. Feeds by standing motionless in the open while curling its brilliant red tail horizontally back and forth as a lure.

23 *Notoscincus ornatus ornatus* (Broom) (9).

SVL 22-35 (28.8). Like the previous species it can be found in all habitats but is most often found on consolidated dunes and loamy flats.

Ecological differences between *Notoscincus ornatus ornatus* and *Notoscincus o. wotjulum* are notable. The nominate race occurs in a similar habitat to, and behaves like, many desert species of *Ctenopus* i.e. it sits motionless in open areas between clumps of *Triodia* waiting for prey or sunning itself. The Kimberley race *N. o. wotjulum* is smaller and has shorter legs and a strong dorsolateral stripe which gives it the superficial appearance of a *Lerista*. This race also feeds like some species of *Lerista* or *Carlia* i.e. it stalks through leaf litter beneath trees and shrubs.

This is the *Ctenopus wotjulum* of Butler (*W.A. Nat.*, 11: 157).

24 *Omolepida branchialis* (Gunther) (39).

SVL 57-108 (96.4). Breeding: up to 5 follicles enlarged. In *T. angusta* on consolidated dunes and loamy flats. 79 per cent of specimens have SVL greater than 90 mm.

25 *Proablepharus reginae* (Glauert) (15).

SVL 20-37 (29.5). Breeding: (one female with two enlarged follicles). All from *T. angusta* on sandy soil. This species is widespread on the Western Australian mainland: southern Kimberleys, Pilbara, Great Victoria Desert, but it is rare. It is one of the most common lizards on Barrow Island.

A notable absentee from Barrow Island is *Menetia greyii* which is common and widespread on the mainland. It appears from their similar size and their complementary distributions that *P. reginae* has almost been eliminated on the mainland by *M. greyii* but thrives on Barrow Island in the absence of *M. greyii*.

26 *Sphenomorphus isolepis isolepis* (Boulenger) (13).

SVL 35-60 (47). Confined to siliceous sand with *Spinifex longifolius*.

27 *Sphenomorphus richardsonii* (Gray) (3).

SVL 57-100. Confined (at least during the day) to caves and deep crevices where it burrows in soft, moist, karst soils.

Family VARANIDAE

28 *Varanus* (?) *acanthurus* (Boulenger) (3).

SVL 83-120 (103.6). All on gravelly or loamy soil; two under rubbish, the other out of *Triodia*.

Varanus giganteus (Gray). Perentie (1).

One specimen, a road casualty. However, a log of Perentie sightings was kept: 27 in all habitats. Every rock shelter, whether a cave or a simple overhang showed evidence of this species' presence.

SNAKES

Family TYPHLOPIDAE

Typhlina diversa (Waite) (1).

Butler (1970) collected one in gravel and *Triodia*.

Family BOIDAE

Liasis childreni Gray. Children's Python (13).

This species shelters in termite mounds during the day and forages in the open at night. From eight demolished mounds 6 *Liasis* were collected; 3 from one mound and 1 each of three others. *Heteronotia* was the only other reptile found in the mounds.

Family ELAPIDAE (including sea snakes)

Demansia psammophis reticulata (Gray). Whip Snake (2)

Butler (1970) collected a road casualty. Another road casualty has been collected since my visit.

Furina christiana (Fry) (2).

Butler (1970) collected one at night on road. One collected since my visit.

Pseudechis australis (Gray). Mulga Snake (4).

One collected in open *Triodia* at night. All but one of the specimens collected by Butler, which was flushed from *Triodia*, were collected on roads at night.

Vermicella semifasciata approximans (Glauert)

Allied Bandy Bandy (2).

Both specimens collected since my visit.

Aipysurus duboisii Bavay (1).

One beach derelict collected on islet in Bandicoot Bay. Head only kept. Ventrals 186, subcaudals 24.

Aipysurus laevis laevis Lacepede (1).

Butler (1970) speared one in 4 m of water.

Emydocephalus annulatus Krefft (1).

SVL 500. This specimen (R47852) is the first specimen collected from the Western Australian coast. The possession of only 3 upper labials (rather than at least 6) distinguishes it from other Western Australian sea snakes.

Ventrals 148, subcaudals 29. Smith (1926) records ventrals 138-144 and subcaudals 20-30.

Ground colour yellowish, with 21 bluish black bands on the body. These bands tend to be confluent on the back, constricted (sometimes broken) on the flanks. Scales in interspaces between bands with decreasing areas of bluish black from mid black (all bluish black) to lower flanks (all yellowish).

The specimen, a beach derelict, was collected by N. T. Allen in January, 1975.

DISCUSSION

The following discussion is restricted to the terrestrial fauna.

Barrow Island consists mainly of undulating limestone caprock intersected with deep cracks which contain alluvial loams. With the exception of 17-18 kilometres of cliffs on the north-west side, the island is bounded by aeolian dunes. These white dunes are backed by several lines of reddish consolidated dunes. Further inland there are usually alluvial loam flats. These flats are largest at Flacourt Bay where, because of altitude the runoff is greatest.

The deep cracks (creekbeds) contain *Triodia angusta* through which are dispersed shrubs, principally *Hakea lorea*, *Petalostyles*, *Acacia bivenosa* and *Gossypium robinsonii*. The alluvial flats immediately behind the dunes are also vegetated with *T. angusta* and the occasional clump of wattle.

The foredune is vegetated with *Spinifex longifolius*, the consolidated dunes with *T. angusta*, *Acacia coriacea* and other shrubbery. In the south and north of the island the alluvial flats have formed claypans covered with grasses.

Thus, 80-90 per cent of the island is a rocky *Triodia* steppe, the remainder being a fringe of sand dunes vegetated with scrub. The overall impression, to quote Whitlock, "represents a desolate and most uninviting appearance". How then, with a limited variety of habitats do 38 species of land reptiles share the island's space and food resources? When each species is examined with regard to its distribution on the island, its diet, body size and time of activity (diurnal or nocturnal) there seem to be surprisingly few species in conflict.

TABLE 1. See discussion for details.

	OTHER INVERTEBRATES												INSECTS						VERTEBRATES					
	Annelida	Crustacea	Scorpionida	Opiliones	Araneida	Chilopoda	Protura	Collembola	Blattodea	Mantodea	Orthoptera	Isoptera	Hemiptera	Neuroptera	Lepidoptera	Diptera	Coleoptera	Hymenoptera	Ctenotus	Delma	Proablepharus	Carlia	Aves	Mammalia
<i>Diplodactylus taeniatus</i>																								
<i>Gehyra punctata</i>																								
<i>Gehyra variegata</i>																								
<i>Heteronotia bynoei</i>																								
<i>Delma nasuta</i>																								
<i>Delma tincta</i>																								
<i>Lialis burtonis</i>																								
<i>Amphibolurus caudicinctus</i>																								
<i>Amphibolurus minor</i>																								
<i>Physignathus gilberti</i>																								
<i>Ctenotus fallens</i>																								
<i>Ctenotus grandis</i>																								
<i>Ctenotus pantherinus</i>																								
<i>Ctenotus piankai</i>																								
<i>Lerista bipes</i>																								
<i>Lerista muelleri</i>																								
<i>Morethia taenioptera</i>																								
<i>Notoscincus ornatus</i>																								
<i>Onolepida branchialis</i>																								
<i>Proablepharus reginae</i>																								
<i>Sphenomorphus isolepis</i>																								
<i>Sphenomorphus richardsonii</i>																								
<i>Varanus (?) acanthurus</i>																								
<i>Varanus giganteus</i>																								
<i>Liasis childreni</i>																								

Distribution of species on Island

According to habitat preferences, the reptiles can be divided into 3 groups: (a) species confined to rocky areas; (b) species found in rocky and sandy areas. Sandy areas include white sands (foredunes), red dunes and loams; (c) species confined to sandy areas. (See annotated list for habitat preferences within the sandy areas).

The following species are only known from the island from one specimen: *Pygopus nigriceps*, *Ctenotus serventyi*, *Morethia lineocellata* and *Typhlina diversa*. It is assumed that these species have the same habitat preferences as on the mainland viz. sandy areas.

Although rocky areas with *Triodia wiseana* constitute about 80 per cent of the area, only 4 (or more probably 5) species are confined to it. They are: *Gehyra punctata*, *Delma tincta*, *Ctenotus pantherinus acripes*, *Sphenomorphus richardsonii* and probably *Ctenotus piankai duricola*.

Species occurring in both rocky and sandy areas include: *Gehyra variegata*, *Heteronotia binoei*, *Amphibolurus c. caudicinctus*, *Cryptoblepharus carnabyi*, *Ctenotus fallens*, *Morethia taeniopleura exquisita*, *Notoscincus o. ornatus* and *Varanus gigauteus*. All but *Cryptoblepharus* appear more common in sandy areas.

The remaining 24 species are restricted to sandy areas, which constitute only about 20 per cent of the island.

Diet

Table 1 shows the qualitative results of the examination of stomach contents.

By adding the number of species which eat the animals in the various invertebrate groups mentioned in Fig. 1 an indication of overall food

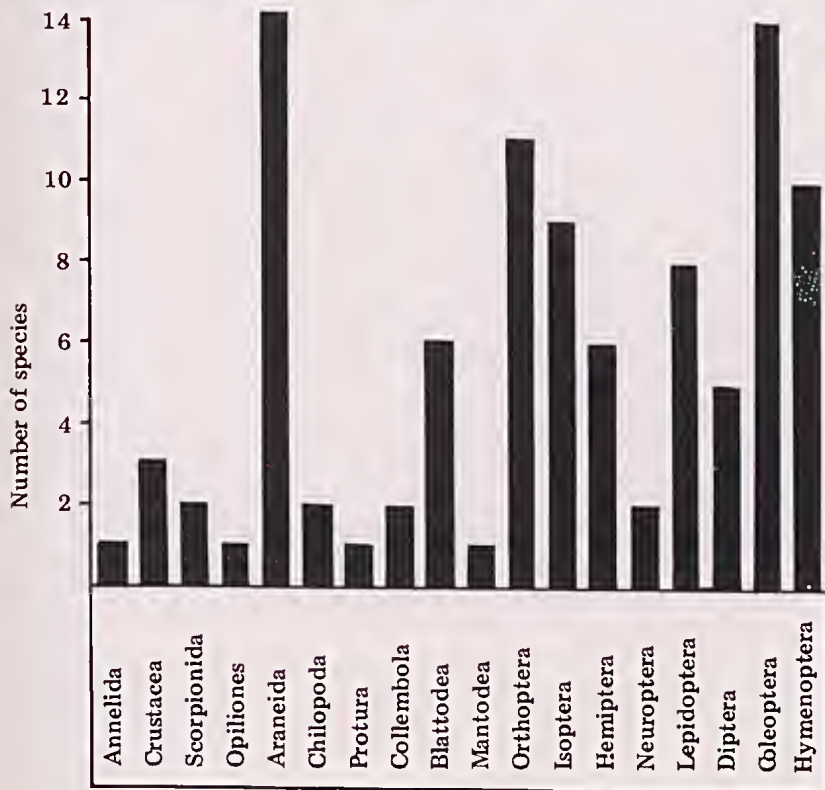


TABLE 2. See discussion for details, p.132.

preferences for the invertebrate-eating lizards can be obtained. This is summarised in Table 2.

Where there is a reasonable sample of animals with identifiable stomach contents, an indication of food preferences can be obtained by scoring the number of times any one of the food groups occurs in each stomach for any one species. From this come the following notable points:

(a) the 100 per cent reptilian diet of *Lialis* (66 per cent *Delma*); (b) every *Proablepharus* stomach with identifiable remains contained hemipterans (leaf hoppers). Only one stomach contained the remains of another

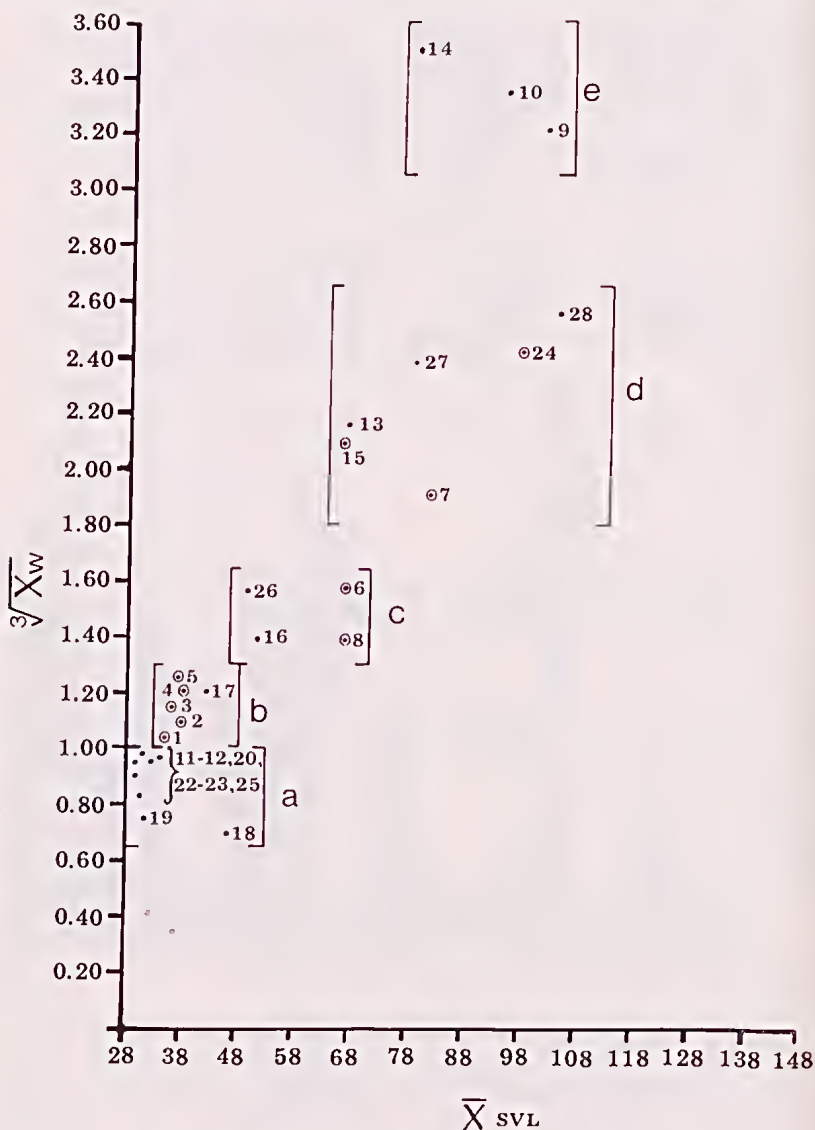


TABLE 3. See under discussion for details, p.133

insect (ants); (c) the 100 per cent ant diet of *Notoscincus o. ornatus*; (d) 92 per cent of the *Amphibolurus caudicinctus* stomachs contained ants.

The diets of *Delma borea*, *D. nasuta*, *D. tincta*, *Ctenotus pantherinus* and *Orolepida branchialis* suggest that they could be nocturnal.

Body Size and Time

In Table 3 cube root of mean wet weight is plotted against mean snout-vent length for adults of each species of lizard with the exception of *Pygopus nigriceps* (incomplete specimen), *Amphibolurus caudicinctus* and *M. lineoocellata* (no adults), and *Lialis burtonis* and *Varanus giganteus* (weight too great for graph). Nocturnal species are circled.

The lizards in Table 3 fall into 5 main clusters comprising:

(a) *Carlia triacantha*, *Cryptoblepharus carnabyi*, *Lerista* spp., *Morethia taeniopleura exquisita*, *Notoscincus o. ornatus* and *Proablepharus*. *Morethia lineoocellata* is comparable in size to *Carlia triacantha* and also falls in this group; (b) the geckos and *Ctenotus serventyi*; (c) *Delma borea*, *D. tincta*, *Ctenotus piankai* and *Sphenomorphus isolepis*; (d) *Delma nasuta*, *Ctenotus fallens*, *Ctenotus pantherinus*, *Orolepida branchialis*, *Sphenomorphus richardsonii* and *Varanus* (?) *acanthurus*; (e) *Amphibolurus minor*, *Physignathus gilberti* and *Ctenotus grandis*.

Summary

Of the species in group (a) above *Lerista elegans* and *Morethia lineoocellata* are litter inhabitants. *Cryptoblepharus carnabyi* restricts itself to areas where there are vertical faces to climb. *Lerista bipes* and *L. muelleri* are fossorial (although *L. muelleri* is probably as much a litter inhabitant as a "sand swimmer"). *Morethia taeniopleura* and *Notoscincus ornatus* have different methods of feeding and different diets. *Proablepharus* lives in *T. angusta* and appears to have a unique diet. The *Carlia* I collected came from an interdune; it could be another litter inhabitant or be found in *T. angusta*.

Of the species in group (b) above, only *Gehyra punctata* is confined to rocky areas. *G. variegata* was probably confined to an arboreal habitat before human occupation. Although still found in this habitat it now also shares rubbish sites with *Heteronotia binoei* and *Diplodactylus stenodactylus*. *H. binoei* and *Diplodactylus taenianus* are found in *T. angusta*. *Ctenotus serventyi* is the only diurnal species in this group.

Of those species in group (c) above, *Sphenomorphus isolepis* is confined to foredunes. *Ctenotus piankai* and *Delma tincta* inhabit rocky areas. *C. piankai* is diurnal and *D. tincta* nocturnal. The one *Delma borea* I collected came from a loamy flat.

Of the species in group (d) above, all but *Ctenotus fallens* and *Varanus* (?) *acanthurus* are nocturnal. *Ctenotus pantherinus* and *Sphenomorphus richardsonii* are found in rocky areas; furthermore *S. richardsonii* is fossorial. *Delma nasuta* and *Orolepida branchialis* are common in *Triodia angusta* on loam flats. *Varanus* (?) *acanthurus* is found on loam and gravel. *C. fallens* in all habitats.

The species in group (e) above are diurnal. *Amphibolurus minor* is restricted to gullies and consolidated dunes where there are substantial shrubs *Physignathus gilberti* is restricted to mangroves. My single *Ctenotus grandis* came from a sandy area.

Of the species not included in Table 3, three occur in *Triodia*. They are *Furina christiana*, *Pseudochis australis* and *Demansia psammophis*. *D. psammophis* is diurnal, the others nocturnal.

Vernicella semifasciata and *Typhlops diversus* are fossorial. *Lialis burtonis* is exclusively a reptile eater, and *Varanus giganteus* eats mammals and birds.

Thus the following species from the foregoing groups seem to be competing for space and food resources. In group (a): *Lerista elegans*, *Morethia lineoocellata* and possibly *Carlia triacantha* and *Proablepharus*. In group (b): *Diplodactylus stenodactylus*, *D. taenianus* and *Heteronotia binoei*. In group (c): *Delma borea* and *D. tincta*. From group (d): *Orolepida branchialis* and *Delma nasuta* and *Ctenotus fallens* and *Varanus* (?) *acanthurus*.

It is interesting to note that 7 of these 13 species are rare on the island.



Plate 1.—Upper left, *Diplodactylus taeniatius*; upper right, *Amphibolurus caudicinctus*; lower left, *Sphenomorphus richardsonii*; lower right, *Ctenotus pantherinus acripes*.

—Photographs R. E. Johnstone

FAUNAL RELATIONSHIPS OF BARROW ISLAND TO MAINLAND

Barrow Island's rich reptile fauna can be attributed to its geographic position. Bassian species which extend northward from south-western Australia tend to have coastal or insular distributions. Similarly, Torresian species which extend southward from the Kimberleys tend to have coastal or insular distributions. Thus, the Eyrean component (approximately 66 per cent of the fauna) is supplemented by *Lerista elegans* and *Morethia lineocellata* (southern species) and *Physignathus gilberti*, *Delma borea*, *Ctenotus serventyi*, *Sphenomorphus isolepis*, *Varanus* (?) *acanthurus* and *Furius* (northern species). *Lialis*, *Liasis*, *Orolepida branchialis*, *Cryptoblepharus carnabyi* and *Pseudechis australis* are members of all three zoogeographic faunas.

At least two species of mammal on the island are represented by endemic races. Two examples are *Macropus robustus isabellinus* and *Isodou auratus barrowensis*. Both are smaller than their mainland counterparts.

Similarly *Pseudechis australis* exhibits dwarfism. Mean SVL of Barrow Island specimens is 633; mean SVL of specimens on the opposite mainland is 1208. It is possible that the small varanid that I have called *Varanus* (?) *acanthurus* is another example of dwarfism.

Four other species have diverged noticeably from mainland populations. They are *Ctenotus grandis*, *C. pautherinus acripes*, *Proablepharus reginae* and *Sphenomorphus isolepis*.

Barrow Island *Ctenotus grandis* have fewer midbody scale rows than specimens from the North-west Division of the mainland (mean 33.3 vs 36.2). Those specimens listed by Butler (1970) as *Ctenotus* sp. (affin. *grandis*) are in fact *C. grandis*.

Ctenotus pautherinus acripes is endemic to Barrow Island. It has more midbody scale rows than *C. p. pautherinus* (mean 38 vs 35.7). The spiny soles of the feet help distinguish this race.

Barrow Island *Proablepharus reginae* differ from mainland specimens in being smaller (mean SVL 30.3 vs 33.2) and darker and in having more subdigital lamellae (mean 23.6 vs 22.8). In most Barrow Island specimens the upper perioocular granules are not hidden by the brow, whereas in most mainland specimens they are hidden.

The colour pattern of Barrow Island *Sphenomorphus isolepis* differs from that of North-west Division mainland specimens. This is described by Storr (1967: 16).

The frequency of 8 labials in *Orolepida branchialis* is much higher in the North-west Division than elsewhere. 30 per cent of Barrow Island specimens have 8 labials compared to 53 per cent on the mainland of the North-west Division. The number of midbody scale rows is high (mean 26.1) in the Pilbara compared to those on Barrow Island and the south of the North-west Division.

The maximum depth of water between Barrow Island and the mainland is approximately 15 m. These data used in conjunction with Fig. 5 of Morner (1971) show that Barrow Island has been separated from the mainland for 7-8,000 years.

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BIRD NOTES FROM A WINTER VISIT TO ECLIPSE ISLAND, WESTERN AUSTRALIA

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The following notes result from a short visit to Eclipse Island, Western Australia, in the winter of 1973. We arrived by boat from Emu Wharf, Albany on 2 August, and made our return on 9 August. We have included some sea-bird observations from these passages.

A general description of the birds of Eclipse Island was given by Warham (1955a). Also, there are more detailed accounts based on observations made at this island with respect to the Great-winged Petrel, *Pterodroma macroptera* (Warham, 1956, 1957), Fleshy-footed Shearwater, *Puffinus carneipes* (Warham, 1958), and the Little Shearwater, *Puffinus assimilis* (Glauert, 1946; Warham, 1955b).

In size the island is about 160 hectares and rises to its highest point at 108 metres where the lighthouse is situated (Fig. 1). The island is granitic with much of it covered in thick scrub, predominantly *Melaleuca lanceolata* (see for example Fig. 4, p. 11, Serventy *et al.*, 1971). In places other shrubs such as *Leucopogon revolutus*, *Verticordia plumosa*, *Andersonia sprengelioides*, *Hibbertia cuneiformis*, *Boronia alata*, *Calocephalus brownii* and *Chorilaena quercifolia*, form a compact low cover, in particular along the western ridge. Some *Casuarina* sp. occurs in places on the steeper northern slopes. Extensive areas of the N.W. of the island were burned by a severe wildfire in 1968. Much of the south-east side of the island is rocky and covered only by very short, cushion-like vegetation, predominantly *Verticordia plumosa*. Cliff Head and the isles off the western end are bare rock. A predominant introduced plant is a South African Arum lily, *Zantedeschia aethiopica*, which was in flower at the time of our visit. Open ground was otherwise closely covered by Pigface, *Carpobrotus aequilatus*.

Lighthouse structures include an abandoned jetty and "Flying Fox". A bulldozed track leads from the new landing facilities to the light-station cottages close to the light-tower at the top of the island. Here there are several additional sheds and stores, some water storage tanks, radio transmission towers and wires, and a power generation plant. Some cleared areas and several additional tracks have been introduced since the island was first occupied in 1925.

Vertebrates on the island, other than a few domestic pets including the Domestic Pigeon, *Columba livia*, are the Rabbit, *Oryctolagus cuniculus*, and a small breeding colony of the Australian Sea-lion, *Neophoca cinerea*. The Rabbit is not numerous and appears to be in little conflict with the breeding avifauna. The history of its introduction is apparently undocu-